# NOAA Teacher at Sea
# Roy Arezzo
# Onboard NOAA Ship OSCAR DYSON
# July 11 – 29, 2007

**NOAA Teacher at Sea: Roy Arezzo**
**NOAA ship: OSCAR DYSON**
**Mission: Summer Pollock Survey**
**Day 9: Thursday, July 19, 2007**
**Log Entry 3**

**Weather Data from Bridge**

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|---|---|
| Visibility: | 10+ nm (nautical miles) |
| Wind direction: | 270° (SW) |
| Wind speed: | 11 knots |
| Sea wave height: | 5 foot |
| Swell wave height: | 5feet |
| Seawater temperature: | 8.1°C |
| Sea level pressure: | 1004.4 mb (millibars) |
| Air Temperature: | 9.7°C |
| Cloud cover: | 6/8, stratus |

**Science and Technology Log:**

I would like to thank **David J. Zezula, Lieutenant Commander for NOAA and Alaska Region's Navigation Manager**, who spent over an hour showing me charts and resources for my school. David is serving as a relief officer of the deck aboard the OSCAR DYSON.

**NOAA's Lieutenant Commander D. Zezula Reading the chart of the North Bering Sea**

Around our second Transect this leg we needed to break off from our line momentarily to avoid some shallow pinnacles listed on the chart. Of the three, one pinnacle is charted in deep water and the tall thin pinnacle seems an unlikely seafloor feature. I was surprised to learn that the information on the printed chart was different from the digital GLOBE program the scientists use to assess the bottom. It was indicated on the printed chart that these shallow regions were charted back before we started making seafloor maps using multi-beam sonar technology. The actual depth in that region is thus questionable and rather than sail over what seemed like deep enough water we cruised

around it for safety precautions. Our draft is about 29 feet and all of sensors are located on the centerboard that extends down below the hull's lowest point. As a research vessel we care very much about our sensors.

I asked David about this and he went to his files and was able to show me more information about the dates and background on that specific chart. Some of the archives he has access to were actually scanned from hand written charts created with lead lines back at the turn of the century. One of the main parts of his job back on land is to help prioritize what regions of Alaskan waters are to be updated with modern technology as part of NOAA's Office of Coast Survey (the hydrographic and nautical charting division of NOAA). Obviously they focus on key ports and channels first but there is much water out there to chart and verify.

**Bird of the Day:**
Today I was fortunate to see yet another "new to me" species. The **Long-tail Jaeger** (*Stercorarius, longicaudus*) is a pelagic seabird that rules the air. Although it probably eats some fish near the surface it is famous for its aerial piracy. It is a very muscular bird that is capable of upending flying birds forcing them to regurgitate their stomach contents to obtain a meal. This is currently their breeding time so it is early in the season for them to be found this far out at sea but soon mature adults and their grown offspring will be out on the Bering looking for food before their winter migration to the south. I keep missing the albatross sightings and hope that it will be my next bird of the day.
Information provided courtesy of Mark Rauzon, birder, author, educator and friend.

**Long-tail Jaeger photographed off the bow of OSCAR DYSON by Tamara K. Mills**

**Personal Log:**
Land! It was very exciting to see land for many reasons. First, the sun was out, a rare treat on the Bering. Many of the weather entries above will list the cloud cover as 8/8, which means out of 8 parts of sky all of it is covered by clouds. Also the visibility was

good and the seas, which turned up with some high winds last night, had calmed down considerably. Lastly we were looking at Russia, many of us for the first time, which made sense since we were in the north part of our third transect line in Russian waters. It was also the first time we have seen land since we left Dutch Harbor. Cape Otvesnyy, at 860 meters high was visible from about 63 miles away. We all went outside the bridge to take photos and celebrate.

**Question of the Day**

**Today's question:** Why do pollock rise in the water column at night?

**Previous Question:** *How is the field of acoustics used in science?*

Acoustics is a huge area of technology that ranges from how we design theaters to the use of sonograms to view unborn children. Much of the acoustic technology used in science has to do with creating alternative ways to observe different environments. Light does not travel through water as far as sound (vibrations). Sound waves are the key to looking deep into water. Marine mammals know this and can find prey with echolocation, reading reflected sound waves they send out to locate food and communicate.

**On OSCAR DSYON we use several types of acoustic instruments**:

The Simrad EK60 is our main fish counting instrument and it uses about a 7º beam to send out sound waves of different frequencies and receive echoes from organisms and objects of different sizes. It is mounted on the centerboard and reads information from 5 frequencies ranging from 18 to 200 KHz. As we run along our transect line the data that is received is used to estimate the fish density. The scientists onboard spend a fair amount of time checking to see that the echoes actually represent pollock.

The ME70 Multi-beam is mounted to the ship's hull and is a powerful tool in creating a wide swath three-dimensional image of what is below the ship. This is especially useful in hydrographic work that involves charting and mapping the seafloor bottom but it may be used for the fish survey in the future.

**OSCAR DYSON's centerboard**

The Acoustic Doppler Current Profiler (ADCP) is also connected to the centerboard and uses the Doppler Effect (the change in frequency and wavelength of a sound pulse as perceived by an observer moving relative to the source of the sound) to estimate current and fish speed.

We place a Net Sounder (FS70, affectionately kr
each time we trawl. Like scientists, commercial fishermen often use this instrument to monitor the shape of the net opening and the amount of fish entering the net. It does this

by sending a 200 kHz frequency beam across the opening of the net and transmits data along a cable for the team to see on our monitors. Along with the turtle we send down a Simrad ITI, which is smaller and wireless but a lower resolution net sounder that is used as backup in the event we have trouble with our cable.

The DIDSON (Dual Frequency Identification Sonar) is an instrument that has been developed for divers in low visibility water and has many industrial applications. It creates an image typical to the one seen on sonogram tests. It uses a high frequency beam (up to 1.8 MHz) to achieve a short-range image (up to 50 meters). It has been applied to salmon return rate studies and has well enough resolution to make out the shape of a moving fish. The pollock survey team has been experimenting with it as a way to monitor fish escapement from the net and how fish behave within the net.

**OSCAR DYSON'S deck crew attaches an acoustic device (yellow) to the fishing gear**

In our survey work most of our mid-water trawls occur between 17 and 700 meters. The acoustic technology is vital to verify fish at these depths.